



# FOREST MANAGEMENT UPDATE

NUMBER: 5

DATE: March 10, 1986



WOULD YOU PUT A SQUIRREL ON YOUR REFORESTATION CREW? 1/  
If you answered "No", Read on

by Lee Alexander and Arlyn W. Perkey

Observations in mixed conifer-hardwood forests throughout the Northeast seem to indicate that eastern white pine seedlings and saplings occur in greater abundance under the canopy of large oaks and hickories than elsewhere. Although there are a number of possible explanations for this, such as favorable light and soil moisture conditions, one important factor is the activity of wildlife related to the use of mast crops (acorns and hickory nuts). Ground disturbances caused by the digging and food gathering activities of wildlife, such as gray squirrels, result in more white pine establishment on a mixed forest site than would occur if oaks, hickories, and wildlife were not present.

**Northeastern Area  
State & Private Forestry  
Morgantown, WV 26505**

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Many investigations have sought to confirm the role of gray squirrels in establishing oak regeneration. However, recent studies at the University of New Hampshire now indicate that digging activity by squirrels also favorably influences the establishment of eastern white pine in mixed stands of pine and oak.

#### Impact of Seed Applications and Squirrel Exclosures

First year white pine seedling establishment was evaluated using various oak-hickory and white pine seed applications under different levels of protection from seed gathering or disturbance activities by gray squirrels.

Overall, the use of exclosures which prevented gray squirrels from disturbing a site, resulted in a 43% decrease in first-year white pine seedling establishment compared to treatment plots with no exclosures. The application of acorns and hickory nuts resulted in a 65% increase in white pine seedling establishment.

#### White Pine Regeneration Density in Relation to Hardwoods

To further analyze the influence of wildlife activity associated with the gathering/burying of upland hardwood mast crops on white pine establishment, six geographically separate mixed hardwood-conifer stands were studied in southern and central New Hampshire. White pine regeneration density was found to be significantly higher when the site was in close proximity to a mast producing oak or hickory. In comparison, there was no significant relationship of white pine regeneration density to the nearest seed producing northern hardwood. When the DBH of the nearest upland hardwood was large, white pine regeneration density was found to be significantly greater. This appears to be logical since large diameter oaks and hickories produce more abundant seed crops per unit area than smaller sized trees. These sites most likely experience high levels of surface disturbance in the fall associated with the gathering of these heavy seed crops by wildlife.

It was expected that white pine regeneration density would be somewhat greater when in close proximity to a white pine seed source. However, findings indicate that white pine seedling and sapling establishment in mixed stands was somewhat more successful at some distance from the probable white pine seed source. In several of the stands studied, understory white pine establishment successfully occurred at distances of over 100 yards from the nearest white pine seed source. This indicates that the total amount of white pine seed produced is less critical to pine seedling establishment than is the mixture and proximity of white pine seed trees to oaks or hickories. In predominantly upland hardwood stands, as few as two white pine seed trees and five mature, mast producing oaks or hickories per 5 acres can be sufficient to cause a desirable level of white pine seedling establishment.

### Chronological Patterns in White Pine Regeneration

The ages of white pine seedlings and saplings occurring as an understory in these same mixed hardwood-conifer stands were also determined. An unexpectedly large portion were found to be 20 to 25 years of age. This age class coincides with a reported period of excellent red oak and white pine seed crops and high populations of gray squirrels throughout the New England region during the mid 1950's. Although there is no way to conclusively establish that it was the acorn gathering and/or soil disturbance activity of gray squirrels during this time period that accounts for the abnormally large 20-25 year age class of understory white pine saplings, it does seem likely that there was some form of region-wide "disturbance" which influenced the occurrence of successful white pine regeneration in mixed upland hardwood-conifer stands in central New England.

### Summary

Although certainly not the only factor, it seems evident that the fall digging activity of gray squirrels has a positive influence on the amount of white pine seedling establishment that occurs in white pine - oak stands. It is digging and ground level disturbance activity that inadvertently covers white pine seed, thus affording it protection from seed consuming small mammals as well as providing a more favorable mineral soil seedbed for germination and seedling survival. Neither the amount of pine seed produced nor the activity of seed consumers may be as important as the role of other wildlife species in determining what happens to the seed once it falls to the ground.

There are many naturally occurring processes which involve interaction between wildlife, plants, and environmental conditions that should be recognized and incorporated into a more ecologically integrated system of timber management. The influence of wildlife and hard mast on white pine establishment in mixed forests probably reflects only a small portion of the complete story.

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### **ATTENTION EASTERN HEMLOCK MANAGERS**

If you have not obtained a copy of Managing Eastern Hemlock—A Preliminary Guide, NA-FR-30, 1985, you may do so by contacting the author, Kenneth F. Lancaster, at the following address: Northeastern Area State & Private Forestry, Louis C. Wyman Forestry Sciences Laboratory, P. O. Box 640, Durham, NH 03842.

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## REVITALIZING BLACK WALNUT PLANTATIONS WITH WEED CONTROL 2/

by Arlyn W. Perkey and Rodney Jacobs

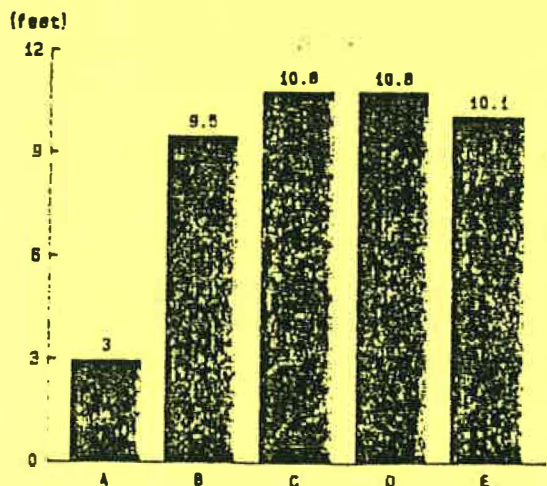
Since black walnut seedlings are very susceptible to competition from broadleaf weeds and grasses, site preparation and post-planting weed control treatments have become recognized as essential management practices during the early years after planting. However, because these treatments are expensive and become more difficult to apply as the trees grow larger, they are usually discontinued after the first few years. By that time the seedlings are expected to outgrow the competing vegetation without further need for weed control. However, frequently the young trees cannot yet overcome the effects of competition, and the stand begins to stagnate.

A good indication of the onset of stagnation is the size and color of the walnut leaves in early summer. Leaves of healthy, fast-growing trees are generally 15 to 29 inches long and dark green until the end of August. In contrast, leaves of stagnating trees are often less than 12 inches long and turn yellow as early as the end of June.

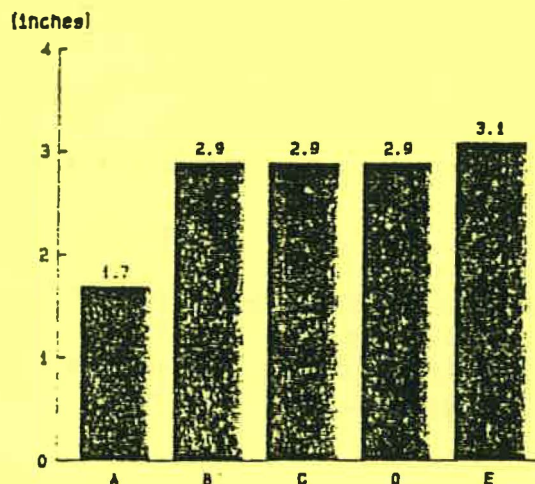
Extended weed control has shown promise in revitalizing growth. The following graphs show some results of a study initiated in an 8-year-old stagnating black walnut plantation in southern Ontario. The study reveals the effects of weed control and nitrogen (N) fertilizer on growth revitalization.

### RESPONSE TO RELEASE TREATMENTS IN 8-YEAR-OLD BLACK WALNUT PLANTATION

FOUR-YEAR HEIGHT GROWTH



FOUR-YEAR DBH GROWTH



- A CONTROL - NO TREATMENT
- B RELEASE WITH SIMAZINE AT THE RATE OF 6 LBS./AC. AT THE BEGINNING OF YEARS 9, 10, AND 11
- C RELEASE WITH SIMAZINE (SAME AS B) PLUS APPLICATION OF 89 LBS./AC. OF NITROGEN
- D RELEASE WITH SIMAZINE (SAME AS B) PLUS APPLICATION OF 178 LBS./AC. OF NITROGEN IN ONE APPLICATION
- E RELEASE WITH SIMAZINE (SAME AS B) PLUS APPLICATION OF 178 LBS./AC. OF NITROGEN IN TWO APPLICATIONS

According to the study, three successive annual applications of simazine for weed control significantly increased the average 4-year diameter and height growth of the walnut trees. It also shows that the response to nitrogen, regardless of the dosage applied, was not significantly greater than that obtained by weed control alone.

In the study plantation, elimination of 90% of the weed competition by the simazine applications greatly increased the size of the walnut leaves and changed their color from pale yellow to medium green. Weed control plus fertilization further increased leaf size, and color became dark green.

**\*\*\* ASSISTANCE IS REQUESTED ON STUMP STUDY \*\*\***  
by Lloyd Casey, Jr.

Eric Wharton, Forest Inventory and Analysis Staff, Northeastern Forest Experiment Station, has authored a publication entitled "Predicting Diameter at Breast Height from Stump Diameters for Northeastern Tree Species". This information can be utilized to estimate the volume of trees when only the stump remains. Unfortunately, black walnut and Paulownia trees did not occur with enough frequency on Eric's plots to be included in the publication.

We would like to request assistance from field foresters in obtaining measurements for any walnut and Paulownia trees they might encounter in the course of their work. Measurements should consist of the DBH to the nearest tenth of an inch and the diameter at stump height, 1 foot above ground. These measurements should be taken on the uphill side of the tree. A measurement of the bark thickness should also be included, as well as the location of the tree.

Please send data to:

Lloyd Casey  
USDA-Forest Service  
State & Private Forestry  
370 Reed Road  
Broomall, Pennsylvania 19008

Once the data is collected, it will be analyzed, added to Eric's tables, and published.

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### **A REMEDY FOR DEER BROWSE ON CONIFERS**

by Marsha Wickle Paxton

Mortality caused by heavy deer browse is a frequent deterrent to planting conifers in many areas. Newly planted seedlings suffer when terminal and lateral buds are browsed, leaving the tree with no new growth. Repeated browsing can cause mortality under otherwise favorable growing conditions.

Protecting seedlings with flexible netting can reduce browse damage to tolerable levels. This netting forms a mesh enclosure (tube) which keeps deer from nipping off buds. Lateral as well as terminal buds are protected. With an annual maintenance routine of pulling the tube up and over the leader, the young trees are able to grow above browse height and gain enough foliage to withstand later browsing. Monitoring in some areas has shown that at a height of 30" a tree has the resources to withstand browse.

To demonstrate how the flexible netting system works, a sample and several diagrams have been attached. Remove the attached netting and follow Figures 1-5, using the tip of a conifer or an actual seedling for practice.

The attached sample is referred to as onion sack or poultry netting and is one of several types available. The netting is sold as "rope" on spools of 1900-3800 feet each. We are trying to locate an east coast supplier for this material.

Netting should be installed at planting time, especially on nursery stock which is so attractive to deer. Planters can easily carry bundles of 50 pre-cut lengths of netting bound with twist ties in a planting bag. Depending on rate of growth of the new seedlings, the tubes will need to be pulled up over the leader once a year. Frequent maintenance will also keep new buds from protruding through holes in the net.

Flexible netting, also known as "vexar" has proven successful in West Coast pine and fir plantations. It has not been as successful on hardwoods which tend to deform inside the net and are vulnerable to browsing damage when rigid branches poke through the netting. The deforming which may occur with conifers is usually outgrown within a few years. The success of the netting will be affected by the frequency of maintenance and the density and perseverance of the deer population.

Please note that before any deterrent is prescribed, it is essential to know both the time of year the damage is occurring and the agent responsible (deer, rabbits, gophers, mice, insects, or other) for the damage. The success of this deterrent, or any other, will vary with these factors.

A sample installation contract and additional information may be obtained by calling Marsha Wickle Paxton at the Morgantown Field Office: Commercial - (304) 291-4484 or FTS - 923-4484.

**Acknowledgement:** Netting sample, application diagrams, and the sample contract are courtesy of the reforestation staff on the Tiller Ranger District, Umpqua National Forest, Tiller, Oregon.



EXHIBIT A (Poultry Net and Onion Sack)

1. Cut one 10" length of tubular netting from the roll. Slip the length of netting over the hand and wrist as shown in Figure 1.

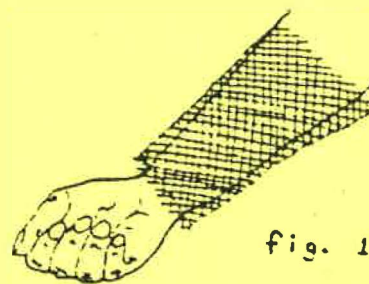


fig. 1

2. Gently close the top whorl(s) of lateral branches and the terminal leader of the tree to be treated with the hand of the netted arm (as shown in Figure 2). Use free hand to slip the netting of the arm and hand, over the tree and hold in place while gently removing the other hand from the netting material.

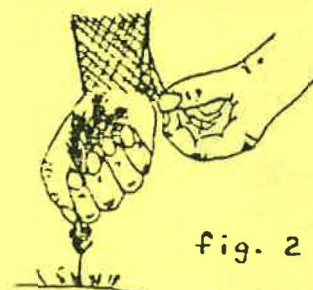


fig. 2

3. Pull the netting upward until 3" of the material is above the terminal bud as shown in Figure 3.

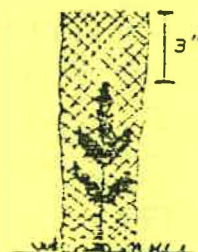


fig. 3

4. Using care not to vertically move the installed tubing, spread the top 3 or 4 inches of the tubing to allow the terminal leader free, unrestricted growth as shown in Figure 4.

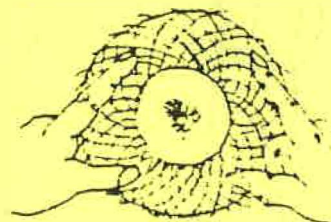


fig. 4

5. Seat the tube on the tree by manually closing the tube around the base to insure that the lateral branch needles will protrude through the tube and help anchor the net to the tree. Needles of the terminal leader may also help anchor the netting. It may be necessary to turn up long tubes from the bottom to keep final installation within the allowable variations. The finished treatment should appear similar to Figure 5.

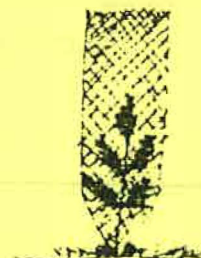


fig. 5



#### SELECTING MAST PRODUCING "LEAVE" TREES IN OAK STANDS

by Arlyn W. Perkey and Kurt Gottschalk

Mast production is vital to both the timber and wildlife resources. It provides an important means of regenerating some of our most valuable timber species, while supplying a critical source of food to a variety of wildlife. Many landowners with wildlife management objectives want to increase the production of mast in their stands. Foresters can help maintain, and hopefully improve, the capability of oak stands to produce acorns.

A review of the available literature on acorn production in the eastern United States revealed some inconsistencies. However, we can draw a few basic conclusions that will help guide our decisions when selecting "leave" trees in stands to be harvested.



SITUATION A:

The forester has advance knowledge that a landowner is interested in selling timber at a later date. Furthermore, the landowner is willing to invest personal time and effort in managing the woodlot.

One of the best ways to maintain and increase mast production is to select "leave" trees that historically have yielded abundant acorn crops relative to other trees in the stand. Ideally, the best acorn producers (individual trees) should be identified in advance of the harvesting activity, and marked as "leave" trees. Unfortunately, since a good mast year is usually needed to identify the best producers, this can only be done on a practical basis when there is strong personal interest by the landowner. For those landowners who do have a high level of commitment to management of their woodlot, the marking of the best mast producers provides a good opportunity for the landowner to become personally involved with a management activity in the woods. This may require some landowner education, and the owner must be willing to inspect the woodlot during seed fall of several consecutive seasons. With this type of involvement, landowners with wildlife management objectives should be more inclined to conduct timber harvesting activities, knowing the best mast producers can be retained in the stand.

SITUATION B:

The forester does not have several years of advance notice that timber will be harvested, or he is working with a landowner that does not wish to contribute time identifying trees that are high yielding acorn producers.

Unfortunately, this situation is most common, and foresters seldom have the luxury of being able to identify the best mast producers based on historical observations. Besides using remanent physical evidence of abundant production, such as old acorn caps, what can be done to at least increase the probability of retaining the best mast producers as "leave" trees?

1. Tree Size

Favor large trees that have wide crowns, and are in a dominant or at least codominant crown position. DBH can be used as a general indication of mast production tendency, although it is less reliable than crown size. In Georgia and North Carolina, the following diameter classes were found to be optimum:

red oak: 12 to 20 inches

white oak: starts at 10 inches, produces well at 18 to  
24 inches

chestnut oak: starts at 10 inches, reaches peak at 20 inches  
(Note: later reports have shown chestnut oak to be  
producing acorns at 7 years of age)

black oak: starts at 10 inches

scarlet oak: 12 to 20 inches

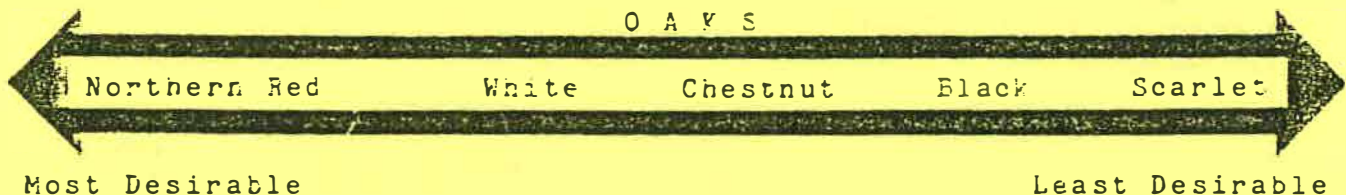
## 2. Tree Vigor

Avoid trees showing signs of low vigor. The presence of dead limbs in the upper crown, giving the tree a stag-headed appearance, is an indication of waning tree vigor. These trees may be valuable as den trees, but they are unlikely to be good, long-term mast producers. Favor trees with healthy foliage, less than 25 percent dead branches, and little or no epicormic branching.

## 3. Tree Species

It is beneficial to have a variety of mast producing species in a stand if wildlife management is a key objective. Trees in the white oak group flower and fruit in one growing season while trees in the red oak group require two seasons. Consequently, species of red oak are exposed to potentially damaging weather conditions for a longer period of time than are species in the white oak group. Since the timing of bumper crops varies by species, it is wise to have trees from both groups represented in the stand. It is not likely that a crop failure will occur in both groups during the same year; thus, reducing the probability of having years with no mast production at all.

Occasionally, when marking "leave" trees, it is necessary to choose between oaks of different species. Considering both timber and wildlife management objectives, and using some subjectivity, we can rank the following species by their relative desirability as mast producers.



Good seed crops for northern red oak occur every 3-5 years. The acorns do not germinate until the following spring, making the crop available to wildlife during the winter season. White oak has less pronounced production peaks, and the acorns germinate shortly after falling.

## Summary

Individual tree characteristics like past productivity, size, and vigor are important considerations for markers to remember when mast production is a criteria for "leave" tree selection. Considering those characteristics, and maintaining a mixture of mast producing species should enable foresters to enhance the acorn yield in many oak stands. Consequently, for landowners with wildlife and oak regeneration objectives, the forester marking the stand has an important service to offer.

## SHARING INFORMATION AND EXPERIENCES

by Arlyn W. Perkey

This is an invitation to participate in the development of future issues of FOREST MANAGEMENT UPDATE. I would like the UPDATE to become a means of technical communication for professional foresters who manage the private non-industrial forests in the Northeastern Area. The majority of articles should address a technical forestry subject that will have interest to readers in a reasonably broad geographic area. Past issues have included articles about silviculture in the upland oak and white pine types. This issue emphasizes some wildlife management topics. I would like to have some articles on mensuration included in the future. The UPDATE could be a media to share some of the successes and failures that individuals in the field have encountered. Consider writing about experiences you feel will be helpful to others who are managing the private non-industrial forest. Do not overlook topics on wildlife management, aesthetics, and landowner recreation. The integration of these forest resources with the management of the timber resource is essential if we are to provide the services desired by many of today's private non-industrial landowners.

If you would like to accept this invitation, please feel free to contact me at the address and phone number below. Also, if you know of other foresters who would like to receive FOREST MANAGEMENT UPDATE, ask them to write and have their names added to the mailing list. I think most service foresters in the Northeastern Area are currently receiving copies, but there may be many interested consultants who are not.



Forest Management & Utilization

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## ATTENTION IBM OWNERS

A new investment analysis program called CASH is now available from the College of Forestry, University of Minnesota. CASH is a menu-driven user-friendly microcomputer program written in Microsoft Basic for the IBM personal computer and IBM compatibles. To use the program, your microcomputer should have at least 128K of RAM. The CASH program disk and a supporting User's Manual are available at a cost of \$30 from the authors, Charles R. Blinn and Dietmar W. Rose, at the following address: Department of Forest Resources, University of Minnesota, St. Paul, Minnesota 55108.



**Attention IBM Owners continued:**

SILVAH (SILViculture of Allegheny Hardwoods) is now available in BASIC language on the IBM PC. This program, developed by the Northeastern Forest Experiment Station in Warren, Pennsylvania, offers the practicing forester a powerful tool for performing calculations and preparing prescriptions. It writes a prescription from data generated by a 10 BAF variable plot cruise of overstory conditions combined with a regeneration and stand conditions survey. To operate the program, your computer must have a memory capacity of at least 128K. The program is available from: Northeast Computer Institute, 1315 South Allen Street, State College, Pennsylvania 16801.

The Central States version of TWIGS (The Woodsman's Ideal Growth Projection System) is now available on the IBM PC. It projects the growth of individual trees in stands, and permits the user to explore the effect of various management alternatives on stand growth and yield. It requires 192K of memory capacity, and 2 disk drives. The program may be obtained from: Nancy Walters, NC Forest Experiment Station, 1992 Folwell Avenue, St. Paul, Minnesota 55108.

**A PERSONAL NOTE**

Ken Lancaster, Forest Management Field Representative, Durham Field Office, has announced his retirement, effective the end of April. During his many years of service in the Northeastern Area, Ken has provided sound, professional advice in a manner that has earned him respect and friendship. We will miss Ken's ever-present sense of Yankee humor, but we do wish him well with his Christmas trees in Canada.

While I'm being personal, I'll say that another friend to many has changed his address. Burl Ashley, former Forest Management Field Representative in Morgantown, has moved from Missouri to 3826 Southland Blvd., San Angelo, Texas 76904. P.S.: Burl says to send rain.

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**LITERATURE CITATIONS**

1/ Alexander, L; Larson, B.C. The influence of wildlife on eastern white pine regeneration in mixed hardwood-conifer forests. Proceedings of the Symposium: Eastern White Pine - Today and Tomorrow. 12-14 June 1985, University of New Hampshire, Durham, NH (in press).

2/ von Althen, F.W. 1985. Revitalizing a black walnut plantation through weed control and fertilization. For. Chron. April 1985.